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All kinds Soda Apparatus, including Morse's
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Soda in twelve minutes.

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Morse's Improved Counter Stand, which secures
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every description of Medicinal Alcoholic Pre-
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Every article of this brand is warranted pure.

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Nitrate Silver Crystals, Citrate Magnesia,
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Carb. Sacch., Plasters, Extracts, &c.

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White Lead, various qualities; White Zinc,
Colors, and Patent Dryers, in assorted
packages.

Price Lists mailed on application.

LYMAN, ELLIOT & Co.,

157 King Street East,

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Original Papers.

**ON SOME OF THE PHYSICAL CHARAC-
TERISTICS OF METALLIC BISMUTH.**

BY B. B. SHUTTLEWORTH.

The introduction of a soluble preparation
of bismuth into medical use has invested the
metal with an interest not heretofore realized
by pharmaceutical chemists. Although the
subnitrate has been officinal for many years,
its preparation has been confined almost ex-
clusively to the manufacturing chemist, and,
as a consequence, druggists are not generally
so well informed regarding its source and
relations, as of those compounds resulting
from the work of their own hands. The ad-
vent of *Liq. Bismuthi*, in the British Pharma-
copoeia of 1867, gave impetus to an inquiry
which had been already set on foot by the
secret preparation of Mr. Schacht, and up to
the present time, the discussion of bismuth,
its compounds, and impurities, has been car-
ried on with uninterrupted energy.

Previous to the middle of the sixteenth
century, the ancients regarded bismuth as a
peculiar form of lead, but G. Agricola, of
Saxony, about the year 1546, (Ure.) proved
its existence as a separate metal. Until quite
recently, the old mines of Schneeberg, in
Saxony, furnished the principal part of the
bismuth of commerce. A few years ago, about
ten thousand tons were produced annually,
of late, the quantity has fallen off, owing to
the mines not being fully worked. A small
supply has been obtained from Cornwall and
Cumberland, and the metal has been found
in Australia and Peru. A large exportation
was said to have been made from the former
locality, last year, but the price appears to
be as yet unaffected, being quoted at present,
in London, at the extremely high figure of
22s. 6d. per pound.

There are a number of ores containing bis-
muth, but it occurs, principally, in the native
state, associated with cobalt, arsenic, and sil-
ver, and is obtained as a secondary product
in the reduction of those metals. As found
in commerce, it is always impure, and is al-
most invariably contaminated with arsenic
and copper, and occasionally, with silver,
lead, iron, and thallium. Chemically pure
bismuth was exhibited by Messrs. Johnson,
Matthey & Co., the great refiners of London,
at the late Paris Exhibition; they stated that
it could be supplied in any quantity for 40s.
a pound; but so far, there had been little
demand for it.

A few weeks ago, we were shown a sample
of a substance sold to a firm in this City, for
metallic bismuth. It bore very little resem-
blance to that metal, and lacked the charac-
teristic pink, or reddish tinge, always ob-

servable. In fact, it could scarcely be mis-
taken for anything but galena, and subse-
quent examination proved it to be such. This
is a substitution which could, of course,
only be practised on those not at all familiar
with the appearance of bismuth.

The specific gravity of the pure metal is
9.83; its melting point is about 500° F., and
in cooling it always assumes the crystalline
form. Perfect crystals form a very pretty
object for the shop window, and preserve
their lustre for a long time. They may be
best obtained by the following method:—
Melt a quantity of ordinary bismuth in
an iron ladle and pour it into a clay crucible,
surrounded by hot sand or ashes; allow it to
cool very slowly, and when a crust has form-
ed on the surface of the metal, make two
openings in it at opposite sides, by means of
a red hot iron. Invert the crucible carefully
and allow the metal to run out by one of the
holes, while the air finds ingress by the other.
Break the crucible as nearly as possible in
two halves; the interior will be found to be
lined with very beautiful, iridescent crystals
in the form of cubes and hollow tetrahe-
drons.

Bismuth is in many respects a curious and
peculiar metal, and in its physical properties
proves rather an exception to the general rule.
It has been stated that its specific gravity is
9.83; when subjected to a pressure of 200,-
000 pounds its density is 9.55, so that it
actually gets lighter the more it is compressed.
When fused it is heavier than in the solid
state. In solidifying it expands one thirty
second part of its bulk, and this property
forms the basis of its application in type
founding, as by the expansion the finest lines
of the type mould are filled and a perfect
letter produced. It has been found that in a
mixture of bismuth with several other metals
the specific gravity of the alloy is greater
than the mean of its constituents. An alloy
of bismuth, lead and tin constitutes the fusible
metal discovered by Sir Isaac Newton, and
melts at a much lower temperature than any
of the metals composing it. According to
Rose a mixture of two parts of bismuth,
one of lead, and one of tin melts at 200°-75 F.
Teaspoons are sometimes made of this alloy
which disappear on stirring a hot cup of tea.
It also serves a more useful purpose as a me-
dium for taking impressions of objects which
would be spoiled by a higher temperature,
as of anatomical specimens, fruit, flowers, &c.
The addition of a little mercury (about one
part) renders this mixture still more fusible.
Bismuth is not at all sonorous, but when
alloyed with tin it communicates sound in a
high degree, and for this purpose is much
used in bell founding.

When subjected to a high temperature it
volatilizes and may be distilled in close vessels.