

by John David Mann
reprinted from Solstice magazine, May 1998, pg. 51

Julius Hensel first discovered the agricultural value of rock dust when, as a miller, he was engaged in grinding some grain. Taking notice of the bits of ground rock accidentally mixed into his meal, he sprinkled some over the soil of a garden he had just begun. The results astonished him. He repeated the experiment, this time applying the "stone meal" to fruit trees. To his amazement, the apple trees "which had previously born wormy, imperfect fruit now produced fine quality fruit, free from worms." After exhaustive experimentation, Hensel had documented the following benefits of his steinmehl ("stonemeal"):

- crops grown with steinmehl all showed increased yield, as well as increased bulk of the individual products;
- foods produced were richer in taste and in nutritional content
- crops were remarkably resistant to insects, fungi and all plant diseases, and to drought and frost; and they withstood the rigors of shipping and storage exceptionally well;
- steinmehl resulted in a steadily improving soil condition and lessened erosion; because it was far less water-soluble than commercial applications, and therefore did not leach out of the soil so readily, it remained active for years, also greatly reducing labor and expense
- and finally, steinmehl-grown produce appeared to greatly improve the health of the animals and humans who consumed it.

Hensel's discoveries were enormously popular. Not surprisingly, farmers in his immediate region made up the majority of his followers. Soon this growing circle also came to include quite a few physicians and a smaller number of scientists as well. A magnificent exhibit of steinmehl-grown produce was held in Leipzig in 1892, the year which also saw publication of Bread from Stones; and there were evidently plans to erect several large factories for the manufacture of steinmehl. But here rock dust ran into a brick wall. Two barriers blocked Hensel's way. The first, straightforward and mechanical, was exacerbated and finally cemented in place by the second, economic and political problem. Hensel did not himself have the means to construct a rock grinder adequate to feed the growing demand. His own methods -- heating rocks over a fire and then plunging them into cold water, after which they were smashed with a hammer -- worked well enough for his own comparatively small-scale trials. But gravel curshings are only efficient when ground to a very fine dust, far finer than a conventional gravel grinder can produce. Evidently Hensel appealed to the German government to aid him in this endeavor, but to not avail. And thus appeared the second problem: for Julius Hensel's discoveries ran directly counter to the prevailing scientific fashion -- and they stood squarely in the path of a burgeoning industry's lucrative onrush.

Science Over a Barrel

Von Liebig's famous "Law of the Minimum" stated that plant growth is controlled by the essential nutrient found in least supply. He demonstrated this by the illustration now known as "Von Liebig's Barrel." The staves of the barrel each represented a single nutrient; some staves were short (for a nutrient in short supply) and some were long. The he made was that the barrel would only "hold water" (i.e. support plant growth) to the level of the shortest stave.

It then followed that whichever elements were in shortest supply should be added to

the soil. Phosphorus (P), potassium (K) and nitrogen (N) were considered to be the elements needed in the greatest amounts. That is, their particular "staves" were most commonly found wanting.

Julius Hensel, writing a half a century later, hotly contested Von Liebig's conclusions: "For the past 50 years, a dogma has crept into agriculture which call itself 'The Law of the Minimum'...This false precept owes its reception solely to the defective method of chemical investigation (i.e. measurement) which prevailed 50 years ago." Hensel wrote that Von Liebig had grossly exaggerated plants' phosphorus and potassium needs, and that the natural chemistry of healthy plants in healthy, fully remineralized soil was far more capable of utilizing atmospheric nitrogen than Von Liebig had understood. Hensel asserted that supplying large amounts of N, P and K actually "forced" growth, temporarily resulting in larger plants and greater yield, but also creating a weaker quality of plant and long-term soil exhaustion.

Hensel and the writers who have followed his tradition have also pointed out that there was no understanding of the vital role of trace minerals in Von Liebig's time. As methods of "chemical investigation" have grown more sophisticated, the number of elements believed to be "essential" to plant growth has steadily risen, from 12, to 20, to 40, to today, where it is believed that over 90 elements may be necessary for optimum plant growth.

Writing of the new knowledge of trace minerals, Lee Fryer in *The New Organic Manifesto* states, "The multi-mineral feeding at this strategic time makes Von Liebig's classical barrel look like Huckleberry Finn's picket fence, it has so many deficiencies to redress." Fryer cites research which helps explain why minute amounts of essential trace minerals can have startlingly broad effects.

"From here we have to sail off into the miniworld, as far as quantities are concerned. For example, in the case of vanadium, a calculation of the amount actually needed shows that two ounces would fertilize about 2,000 acres of crops, something like a 'whiff' or a 'smell' per acre." (*The New Organic Manifesto*, pg. 97)

Another aspect of Von Liebig's teachings that Hensel disputed sharply was the belief that nutrients must be available to the plant in solution. John Hamaker has emphasized and elaborated on the position that, contrary to conventional, Liebig-derived theory, plants are able to directly absorb nourishment from their natural environment through their root filaments. Helmut Snoek, the soil remineralization researcher and author of *Das Buch Vam Steinmehl* asked about Hamaker's view on this, replied,

"Exactly! And Von Liebig said 'only nutrients in solution.' The root does not only take in mineral elements through a solution. It can also take up giant protein molecules, even total proteins. Fifty years ago Professor Warburg showed that they can take in protein molecules with up to 15,000 atoms, but the newest research shows they can take up to 50,000 atoms and more." (from *Soil Remineralization News*, Fall/Winter 1986, pg. 5)

In any case, what now appears the rather simplistic notion of supplying a man-made solution of only several elements to achieve optimal conditions in plants, is gradually being supplanted, in soil science as in nutrition, by a humbler awareness of the complexity and scope of nature's way. Evidently Von Liebig sensed this toward the end of his life:

"I had sinned against the wisdom of the Creator.... I wished to improve His work, and in my blindness believed that, in the marvelous chain of laws binding life on earth's surface and keeping it always new, a link had been forgotten which I, weak and powerless worm, must supply."

--quoted in *The Survival of Civilization* from *Encyclopedia Britannica*, 1899; removed from subsequent editions.)

[Julius Hensel's book *Bread From Stones* has been recently republished by eco-farming advocate Acres, USA, P.O. Box 8800, Metairie, LA 70011]