gous foes with the long end of the lever. It must be a good, promising crop that will warrant the expense of fungicidal applications, and the larger the promise the greater the profit.

One other thought that follows upon this, and the end of this paper is reached. When a house or a community is afflicted with some contagious malady, pains are taken that the germs of the disease shall not remain lurking in out-of-the-way places, and assert themselves in the future. The carpets, and even wall-paper, are removed and the whole house fumigated or otherwise treated with some germ destroyer. While as thorough a cleansing as this is not possible in orchard, vineyard, or garden, there are some measures that could be taken with profit. If weeds are left to mature and scatter their seeds, weeds are expected to follow. In like manner, if all diseased leaves, stems, and fruit are allowed to pass the winter undestroyed, the chances are that the biblical injunction will not be overturned — concerning sowing and reaping. There is a legitimate and therefore profitable amount of soil-sanitation to be done, which comes under the head of cleaning up after crops. The burn-heap is to be a potent factor in future horticulture. If we continue to scatter the seeds of fungus decay, of that sowing we shall reap corruption.

It is a law of plant culture that the continuous growing of any one crop upon a given area of soil, tends to the concentration of the enemies of that crop — whether of insects or fungi. With annual crops, like most of those of the garden and grain field, the remedy is more easily applied, than in the case of fruits. There is a strong inclination to grow the crop for which the soil is naturally best fitted. Thus the onion grower desires to keep his best onion land continuously in onions, and the smut finally increases and ruins his crop and future prospects. Sweet potatoes can be grown to greatest profit only upon a special soil, in limited areas, and constant cropping has permitted the soil-rot to increase to such an extent that the crop is often a failure. The same is true of clover and other crops, but more particularly of those that are susceptible to some root disease. It therefore follows that in the serious consideration of our subject, the importance of a judicious management of crops should never be overlooked, and a system of rotation adopted that will bring the greatest health, other things remaining reasonable and satisfactory.

This continuous change of crops, united with full rations of available plant food, and proper sanitation, will do much to lighten the labors of the fungicidal applications, and render all such when found necessary of the greatest benefit.

Let the spraying of crops with compounds of copper, etc., come after the fair thing has been done for that crop under the head of farm or garden management. Here, as elsewhere, the ounce of prevention is worth a pound of cure, simply because it is prevention, and if we look at fungicides carefully, it will be found that they are preventions, after all.

Do not let me be misunderstood in this matter, for I am a full believer in the virtues of fungicides. There are many places where they pay and pay well, but they cannot do everything. They may ward off destructive diseases, as the copper salts for the black-rot of the grape, but they alone will by no means bring a profitable crop. Everything else needs to be done for the vines that will bring a full fruitage, and then it will pay to save the crop from premature decay. And finally, to carry my point one step further, when the plants have been surrounded by the best sanitary conditions, it is possible that the application of fungicides may be sometimes omitted. However, it will be a long time before all these points are settled, and in the mean time nothing is lost by turning them over in our minds.

ASTRONOMICAL NOTES.

A PLANET of the twelfth magnitude was discovered by Borrelly at Marseilles, France, Nov. 27. The position of the planet was in R.A. 4 h. 6 m. 6.7 s, $\delta + 33° 32' 58''$. The motion was -1 m. in R.A. and $-7'$ in declination.

The following ephemeris will assist those who desire to make a search for Winnecke's periodic comet, mention of which was made in a recent number of *Science*. The epoch of the ephemeris is for Berlin midnight.

1892	R.A.			Dec.	
	h.	m.	s.	°	′
Jan. 1	12	17	12	+13	2
2		18	15	13	4
3		19	17	13	7
4		20	18	13	9
5		21	20	13	12
6		22	20	13	15
7		23	20	13	18
8		24	20	13	21
9		25	19	13	25
10		26	17	13	29
11	12	27	15	+13	33

The following is a continuation of the ephemeris for Wolf's comet. The epoch is for Berlin midnight.

1891	R A.			Dec.	
	h.	m.	s.	°	′
Dec. 27	4	14	22	−14	37
29		14	19	14	26
31		14	33	14	16
1892 Jan. 2		14	33	14	5
4		14	51	13	53
6		15	15	13	39
8		15	45	13	25
10	4	16	22	−13	16

An interesting fact connected with the movement of this comet through the heavens, as seen from the earth, is that on the 6th of next February it will occupy almost the same position in the sky that it did on Nov. 12 last. This is also true of Nov 14 and Feb. 8; Nov 16 and Feb. 10. G. A. H.

NOTES AND NEWS.

THE *Pintor* or *Aguaje* is a singular phenomenon observed in the Bay of Callao during the summer months, from December to April. It consists of emanations of sulphuretted hydrogen gas, accompanied by changes in the color of the sea-water. The name "Painter" is given to it because it gives white paint a blackish tinge. Its occurrence is not confined to Callao, but is observed at various points along the coast from Payta (5° 5′ 30″ south latitude) to Pisco (13° 42′ 42″ south latitude), and at Pacasmayo (7° 24′ 30″ south latitude). The gas proceeds from the black mud which covers the bottom of the bay, and the reddish discoloration of the water is due to the presence of infusoria brought in from the open sea. It is not, however, definitely decided why the phenomenon occurs only in the summer and at certain points of the coast. According to Raimondi (*Bull of Amer. Geog. Soc.*, Vol. XXIII., No. 3), the waters of the Rimac are prevented from escaping from the Bay of Callao by the Humboldt current, which flows past the entrance, and, with the solid matter held in suspension, are exposed to the full force of a tropical sun. Where there is no river, or no current running along the coast, the "Painter" is not observed.