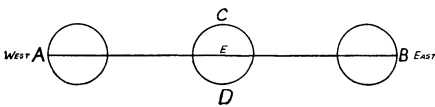


more readily will the air at the upper end be able to spread out and leave the column below free from the pressure of accumulation, and the more violent will be its effects at the surface of the earth.

22. If the dew point should be much below the temperature of the air, the visible spout or cloud will not reach the surface of the earth, and then the rain falling through the lower atmosphere may, partly by its impulse and partly by its cooling influence, (thus increasing its specific gravity) cause the air at the surface of the earth to move *outwards* in all directions from the centre of the shower, especially in front, while all the time, the air at some distance above is running *inwards* from the circumference of the cloud at its lower borders, and of course upwards in the centre, and outwards in the upper parts. If we suppose a dew point 20° below the temperature of the air, we shall find, by calculating according to the law (article 3,) that the lower borders of the cloud will be a little more than twenty hundred yards high; and when the dew point is nearer the temperature of the air, the cloud will be nearer the earth at the lower extremity. This reasoning applies to clouds of moderate size.

23. But if the cloud is of great size, then the supply of air to keep up the ascending column cannot be afforded without reaching down to the surface of the earth, even when the lower part of the cloud may be at a considerable distance above the surface of the earth. Thus the law will become general, that *in all very great and widely extended rains or snows, the wind will blow towards the centre of the storm.*

24. From this law it will be easy to understand (when a round storm is in our neighborhood) not only the direction in which it is raging, but the course in which it is moving. For let



A E B be the direction in which the centre of a storm is moving, say from west to east, and C an observer to the north of that line, and D one to the south, when the storm comes within disturbing influence, as at A, the observer C will have the wind to begin to blow from a point north of east, and the observer D from a point south of east, and to the observer E, due east. When the storm shall have advanced to E, the wind to observer C will be changed

round to north, and observer D to south, blowing at that time with its greatest violence; whilst to observe E, it will be calm, without having changed its direction, only having gradually increased in violence, as the borders of the storm approached, and gradually diminished in violence as the centre approached. Moreover, if the storm is very violent and not very low, the barometer at E will be very low when the centre of the storm is there, and there will at that time be no rain; for the upward motion of the air will carry with it the drops of rain, and throw them off at the sides; but, in the mean time, it will continue there very dark and cloudy.

As the storm passes onwards towards B, the wind will suddenly commence blowing from the west at E, increasing in force there for some time after it begins to diminish its violence at C and D, where it is now changing round respectively to west of north, and west of south. In like manner it may be shown, if the storm moves in any other direction, that this direction may be as-

GEOLOGY

Studies on Mineral May Yield More Accurate Age of Earth

NEW MEASUREMENTS on a very old mineral have given the possibility of a new accurate determination of the time since the molten earth cooled sufficiently to form a solid crust. This new glimpse into the past of the earth comes as a result of the work of Dr. A. von Grosse and Dr. J. D. Kurbatow working at the Institute of Technology, Berlin.

That the earth is at least 1,800 million years old is one of the conclusions recently reached as a result of studies in physics and geology by the Committee of the National Research Council. A revision of previous calculations may be necessary, however, since the recent work. Physicists have grown accustomed to changing their estimates on this problem from time to time. During the last century, before the discovery of the radioactive atoms like radium, the noted British scientist, Lord Kelvin, was quite sure that the sun even could not be older than 50 million years; and of course the earth had to be younger than the sun.

The new research in Berlin indicates

certained by a single observer, provided the storm is round.

25. If the velocity with which storms travel along the surface of the earth shall be ascertained, then not only their direction but their distance from a single observer may be known from the angular velocity with which the wind changes.

Science News Letter, July 25, 1931

Spending a day with a razorback hog may not be an attractive enterprise, but such a procedure recently yielded some valuable information to the State Forest Commission of Mississippi.

Believing that the razorback was a serious destroyer of longleaf pines, and wanting to get irrefutable evidence on the subject, P. N. Howell, one of the commissioners, followed a hog for eight and one-quarter hours, from 8:00 o'clock in the morning to 4:15 that afternoon. In that time Mr. Howell counted 400 trees which the hog rooted out.

that the ratio of actinium to radium is four per cent. in the "Wilberforce uranite" examined. This fact gives a new check-up on the reliability of the most accurate clocks used by physicists in solving this problem. Those clocks are provided by the unchanging disintegration of heavy radioactive atoms into lighter atoms.

Uniform Rate of Disintegration

As this process has been going on for millions of years at the same rate as now, it is possible by measuring the amount of lighter atoms formed to know how long the break-up has been going on. These lighter atoms are very similar in nature to lead, and cannot be distinguished from it by ordinary chemical means. Separate clocks are given us by three different chains of elements which start from uranium, thorium and the yet-unknown parent of proto-actinium. The end of the uranium chain is radium "G," of the actinium chain is actinium "D." By measuring the amounts of lead, uranium and thorium and the relative amounts of

radium G and actinium D two independent checks on the age of the earth can be obtained from the radium clock.

The new figure given for the actinium-radium ratio is different from that accepted by the National Research Council Committee: three per cent.

At present the greatest possible age for our planet is believed to be 3,000 million years.

Science News Letter, July 25, 1931

INVENTION

Dripless Pitchers Designed By German Engineers

GERMAN ENGINEERS are developing pitchers that will not drip on the table.

An investigation of household appliances in general is being conducted under the auspices of the German National Engineering Society, Verein Deutscher Ingenieure, a report to the American Standards Association reveals.

The hausfrau's necessity of buying only inexpensive and foolproof articles has prompted engineers to lend a hand. Correct design of home utensils is receiving careful study while engineering is also being applied to such problems as nutrition, food preparation, and heating and lighting.

Science News Letter, July 25, 1931

SPENCER SCIENTIFIC AND EXPERIMENTAL WORKS
4503 Wolf Street, Denver, Colorado
Optical Engineering and Designing
Repairing and Special Work
Assistance in Experimental Work
Instruction in Technical and Scientific Subjects
Astronomical telescopes, reflectors, prisms, gratings, lenses, standard flats, gauges, optical instruments, supplies, patterns, castings, agate work, crystal specialties, testing, and used equipment

PHYSIOLOGY

Automatic Reaction Protected Body Before Mind Developed

BEFORE conscious mind evolved, there was the automatic protective response of the living thing which still operates in the unhappy physiological "kicks" that hay fever-producing pollens give the unfortunate human sufferer.

This new idea of one phase of man's evolution has been advanced in a scientific paper by Dr. Henry Sewall of the University of Colorado, just published in the magazine, *Science*.

His theory concerns the nature of that very perplexing condition called allergy, present in hay fever, for instance.

Some unfortunate people are hypersensitive to the protein material in various plant and tree pollens, so that tiny amounts of these proteins cause the sneezing, sniffing and otherwise distressing condition known as hay fever. Still other people are hypersensitive to the proteins of certain foods, and become startlingly ill after eating such foods. Fish and eggs are often the offenders in these cases.

The protein of disease germs also causes widespread reaction in the bodies of sensitive persons. The germ of tuberculosis is particularly active in this regard. People who are not affected by germ proteins are called immune to that germ or disease. But whether it is hay fever or idiosyncrasy for certain foods or susceptibility to disease, the entire

condition is spoken of by scientists as allergy.

Many theories have been advanced as to the nature and cause of allergy, but none of them has been universally accepted. Dr. Sewall suggests that if allergy is considered as similar to a mental response to danger, research on it may be more fruitful and conclusive.

Allergy, he explains, seems to be the response of the body to an invading enemy. Fear and pain are other responses which we make when danger threatens. These responses, however, are mental.

Response to Enemy

Before men and other animals had progressed to the point of having minds, so that they could feel pain and fear, the organism was merely a community of living cells. Yet this community must have had some way of meeting danger from without, or it would never have survived to develop into the animal and human bodies we know today. Allergy may have been the pre-mental response of these cell-communities to danger, a sort of forerunner, in the evolutionary scale, of fear and pain, Dr. Sewall suggests. It has persisted in the highly developed bodies we now have, so that it forms an auxiliary to fear and pain as a means of protecting us from danger and attacks of invisible enemies.

Science News Letter, July 25, 1931

CONVENIENCE COUPON

for New or Renewal Subscription to Science News Letter

Send this coupon to Washington while you are thinking of it.

**Science News Letter,
21st and Constitution Avenue,
Washington, D. C.**

Please } start } renew my subscription to SCIENCE NEWS LETTER. I am enclosing remittance as checked below:

- 2 years, \$7
 1 year, \$5

Name _____

Street Address _____

City and State _____

If this subscription is a renewal, check here

STANDARDS

"Skin" Test Determines Wear Length of Varnishes

SCIENCE has made it possible to tell which finishes, varnishes, and lacquers will wear longest. Under a unique test recently developed at the Bell Telephone Laboratories, disks of wood or metal are given coatings of different kinds of finish and speedily rotated through sand. The disk that emerges from the treatment with the least "skin" rubbed off is rated to have had the best finish.

Science News Letter, July 25, 1931

Homing pigeons were used by the Greeks to carry the names of Olympic victors to various cities of Greece.