trical Conditions Accompanying West Texas Sand-storms" before the American Physical Society at Reno, Nevada, which paper was abstracted in the *Physical Review*, 30: 362, September, 1927.

Of the four papers mentioned above, it seems to me that only two refer to anything like similar conditions. The experiments of Brasch, Lange and Urban, in Switzerland, were made during thunder-storms. The air was probably quite free from dust. Nothing is said on that particular point, but one would expect the air to be quite pure in the mountains of Switzerland. The observations of Benade, in India, seem to have been made when a variety of atmospheric conditions were present such as sand, dust, rain and lightning. I take it for granted that the climate in that part of India is quite moist, although the author says nothing on that subject. The observations of Canfield in New Mexico and of George, Young and Hill at this school were made under cloudless skies when rain, thunder and lightning were conspicuous by their absence. As a matter of fact, west Texas sand-storms are generally accompanied by a humidity so low as to be almost unmeasurable. I believe it is generally understood that whatever the cause of sand-storm electricity may be, it is altogether different from that which is responsible for the electrical display during thunder-storms.

By reference to the above-mentioned abstract it will be observed that we obtained voltages about twice as high and currents about six times as great as those observed by Benade. As to the magnitude of the current, however, I think it probable that, under given conditions, it varies directly with the total area of the collector. That, however, remains to be verified. Our collector was a radio aerial consisting of a single stranded wire 33.75 meters long arranged east and west in a nearly horizontal position, with a lead-in wire about one third as long.

I think Benade is quite right in intimating that the effect is not due entirely to friction. Recently Dr. W. H. Abbitt, of this laboratory, has made observations which seem to indicate that an effect may be obtained during a sand-storm from a loop aerial located in a practically dust-proof laboratory. These observations, however, need confirmation.

The climatic conditions at Jornado Range are probably quite similar to those in west Texas, and Canfield's observations are very interesting to us here. I am inclined to think, however, that he is mistaken on one point, and that is with respect to the arc which he says he obtained. To maintain an arc three and one half centimeters long in the open air would require a current of quite a different order of magnitude from what I believe to be possible under the conditions of his experiment. Besides, the ends of the wire, under the intense heat of the arc, would have rapidly melted away. The melting-point of copper is not over 1080° Centigrade, while the temperature of the arc may run up to about 4000° Centigrade. I am of the opinion that what he observed was a succession of spark discharges which followed each other so rapidly that, due to persistence of vision, it seemed to be continuous. The noise, however, would probably be quite different from that of the arc. The glow which he obtained at night seems to have been a corona discharge.

There is a world of literature on the subject of atmospheric electricity dating back to and beyond the experiments of Lord Kelvin. An excellent résumé of the literature on the electrification of various kinds of dust and smoke is given in "Clouds and Smokes" by W. E. Gibbs published by J. and A. Churchill, London. But in spite of all that has been done in this field, a field pregnant with great potentialities, we have scarcely made a beginning. Dr. Abbitt has taken over the work on stand-storm electricity at this school. He is now working on a new type of apparatus for measuring the electrical potential of the atmosphere.

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ABSENT-MINDEDNESS AS A FACTOR IN PROFESSIONAL ETHICS

Several exceedingly interesting instances of professional ethics which have more or less recently come to my attention furnish food for thought. They are related here with essentially correct details but purposely disguised so that the authors, specialities and countries can not be identified; the purpose of this disguise (involving "not less than" in connection with the number of pages and number of illustrations) is to bring out underlying principles without embarrassing the authors. Upon relating these cases to some colleagues "in the club," a responsive chord was struck and I was urged to publish the instances.

The citations themselves can well be prefaced by the premise that practically all authors occasionally, however absent-mindedly and inadvertently, commit sins of omission or of commission. The instances here related represent somewhat extreme examples of absent-mindedness (if that be the correct technical term).

Case 1. An article of not less than forty pages, with not less than fifteen illustrations; ten of these are immediately recognizable to the initiated as copied from other authors, but no acknowledgment is given.

Case 2. An article of not less than six pages, with not less than eight illustrations; four of these are

copied from other authors; acknowledgment is made for two of them.

Case 3. An article of not less than thirty pages, with not less than ten illustrations; four of these are copied from other authors; acknowledgment of source is given for one illustration.

Case 4. An article of not less than twenty pages, with not less than ten figures; at least five of these are copied (one from a deceased author); source is stated for one, not stated for three; one of these figures is copyrighted by another publisher.

Case 5. A specimen was sent by a collector to a certain specialist for determination. The determination was made and a detailed drawing of it was prepared, involving certainly many hours of intensive work. The collector asked to borrow the drawing and the specialist was delighted to lend it to him. In a few weeks this drawing was published by the collector in a copyrighted journal with no reference as to its source.

Case 6. The prize case for "absent-mindedness" is an article of not less than fifty pages, with not less than twenty-five illustrations, all given as "original." Some of these figures bear a remarkable resemblance to old friends, but there is something unnatural about them. The artist explained this interesting puzzle. He said (in effect): When Dr. X— wants an illustration, and finds one to suit him, I photograph it, then draw the negative [reversed] view; for instance, a left view now shows as a right view, and *vice versa;* of course the illustrations thus become original drawings.

Many other cases might be cited, but the foregoing are sufficient to remind us all that possibly none of us is entirely free from absent-mindedness. A story is making the rounds of Washington that a man of non-scientific training heard of "professional ethics" and expressed surprise when he learned that this was not some sort of a skin disease. Is it possible he had in mind the condition known as pachydermia?

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

A MODIFIED FORM OF NON-ABSORBING VALVE FOR POROUS-CUP ATMOMETERS

As was first pointed out by Livingston,[1] the porous-porcelain atmometer must be provided with an arrangement to prevent water absorption through the porous evaporating surface in periods of rain, fog or dew formation. This necessitates the presence of a valve in the tube that connects the porous cup with the water reservoir below, the valve being so constructed as to allow movement of water upward while it practically prevents downward flow. Livingston's original mercury valve[1, 2] has been modified in various ways, and several forms of it are now in use.[3] Another form of valve is that of Livingston and Thone,[4] which is now generally used.

In all these valves excepting the one last mentioned, the downward hydrostatic pressure of the water column in the supply tube is balanced by a mercury column of equivalent hydrostatic pressure acting in the opposite direction when free water is in contact with the outside of the porous cup above, as in times of rain. Although differing in detail these all consist essentially of a U-tube containing mercury inserted in the water-supply line from reservoir to cup. When water is moving upward it forces the mercury into one arm of the U-tube and then passes around it. When absorption through the atmometer wall begins mercury rises in the other arm until the mercury column in that arm balances the downward pressure of the water, when absorption and backward flow are halted. With each closure of this type of valve a small amount of water enters the reservoir. If a number of valve reversals occur in a period of operation (as when periods of absorption and evaporation follow each other on a day of frequent showers) the error thus introduced may be considerable,[5] but its magnitude is so small as to be practically negligible in most instances. The absorption error for each reversal of a value of this type is, of course, a volume of water equal to the volume of mercury held in the second arm of the tube when the valve is closed, and the bore of the tube used for this arm should therefore be as small as is practicable.

The Livingston-Thone valve consists of two porous plugs a centimeter or two apart in the vertical supply tube, with a small mass of mercury enclosed between them and resting on the lower plug. As water moves upward it passes around the mercury, the column of which is only a few millimeters high, but downward flow is prevented because the mercury mass acts like an ordinary poppet valve, seating itself on the lower

[1] B. E. Livingston, "A Rain-correcting Atmometer for Ecological Instrumentation," *Plant World,* 13: 79–82, 1910.

[2] B. E. Livingston, "Atmometry and the Porous Cup Atmometer," *Plant World,* 18: 21–30, 51–74, 95–111, 143–149, 1915.

[3] Frank Thone, "Rainproofing Valves for Atmometers: A Résumé," *Ecology,* 5: 408–414, 1924.

[4] B. E. Livingston and Frank Thone, "A Simplified Non-absorbing Mounting for Porous Porcelain Atmometers," SCIENCE, 52: 85–87, 1920.

[5] E. M. Harvey, "The Action of the Rain-correcting Atmometer," *Plant World,* 16: 89–93, 1913.