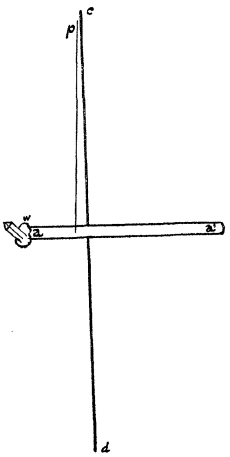
The crystal is mounted so that the intersection edges of the faces to be measured are parallel to and almost in line with the axis. The goniometer is held so that the crystal is close up to the eye, that is, with the protractor part extending perpendicularly in front of and away from one. The crystal is rotated by means of the axis until the reflected image of a window bar, electric light or similar object for a particular face coincides with



some line of reference such as a chalk mark on the floor, a ruler or the edge of a table. The reading is taken for this face, then the crystal is rotated until a similar image is obtained for an adjacent face. The difference between the two readings is the desired interfacial angle (supplement angle). And so on for other faces in the zone. As the protractor is a semi-circle, only 180° of a zone may be measured at one time and the crystal must be remounted for the rest of the zone. A face must always be connected up with its image.

The sources of error are: first, the edge can not be made to coincide exactly with the axis, and second, the angles can not be read much closer than quarter degrees. Yet the goniometer furnishes a simple method of measuring small crystals with bright faces even when the faces are minute, and of testing whether a given face lies in a given zone.

Some measurements obtained on pyrite crystals will show the accuracy of the instrument. The calculated angles are indicated in parentheses alongside the measured angles. 210 $\wedge$ 311 = 25° (25° 14′); 311 $\wedge$ 211 = 10° (10° 2′); 211 $\wedge$ 111 = 20° (19° 28′); 210 $\wedge$ 100 = 27° (26° 34′); 210 $\wedge$ 111 = 38° (39° 14′). These faces were all bright and gave good images, but some of them were less than one half mm. in width.

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The Existence of Rœstelia penicillata and its Telial Phase in North America

In taking up the study of the flora or fauna of a new region systematists attempt to make use of established names. In doing so they sometimes apply them to forms afterwards found to be wholly unlike those for which the name was originally intended. The name then occurs in the literature and the matter of determining what the species listed under it really are may require much subsequent study. Such is the case, in the mycological literature of North America, with *Rœstelia penicillata*,[1] a very old European name dating back to the time of the earliest mycological workers. It was chiefly applied by the first American authors attempting systematic work in this field to the form *Rœstelia pyrata*, now known to be distinctly American, but some other entirely distinct forms such as *Rœstelia globosa* and *Rœstelia lacerata* were often referred to it, so that it is not possible to determine in every instance just what species some earlier American writers had in mind when they used the name *R. penicillata*. It was frequently used in local catalogues and was much overworked, until somewhat later it was authentically shown by an American investigator[2] that the genuine *R. penicillata* of Europe was a very characteristic form differing materially from anything then known in this country. At that time, however, exploration had not extended beyond the eastern and central states, and that there should occur in the western mountains strange and different forms is not a matter of surprise, but that

[1] *Rœstelia penicillata* (Pers.) Fries, Sum. Veg. Scand., **2**: 510. 1849. (*Æcidium penicillatum* Pers.; Gmel. Syst. Nat., **2**: 1472. 1791.)

[2] Thaxter, *Proc. Am. Acad.*, **22**: 265. 1886.

R. penicillata should exist there is an item of peculiar interest. The fact that the first specimens of it collected in that region were described as a new species, *R. fimbriata*,[3] serves as a natural continuation of the confusion regarding the species in America, and it may be properly remarked here that there has also been some confusion in Europe regarding its identity. To reiterate, then, the name *R. penicillata* was introduced into American literature and first made to apply to forms afterwards found to be distinctly American, it was next decided that it belonged exclusively to a European species not occurring in North America, and that view is probably the prevailing one at present.[4] Now, when we make out that we have the species to which the name in its proper usage belongs, we find that it has already been described under an independent name.

Discovery that this peculiar rœstelial form existed in this country immediately raised the question as to why the telial phase should also not occur. Turning to the work of European investigators[5] who had conducted culture experiments, it was soon made out that the *Gymnosporangium* stage was also very characteristic and unlike any of our well-known American species. An examination of several large herbaria had not revealed any such specimens, and since it was known to have such a peculiar form it seemed evident that it had never been collected in this country. The fact, however, that the rœstelial form existed here seemed convincing evidence that the telia should also occur. Several collectors in the proper regions were then interested in the matter, the form was described to them and they were asked to be on the lookout for it in the field. The results were most gratifying, for two collections were made during the season of 1907, one in Colorado and another in Alberta, Canada.[6] These specimens agree well with the foreign ones in general appearance as well as in size and shape of the spores and other microscopic details. Their host is the dwarf juniper, *Juniperus siberica*.

Having concluded that *Rœstelia penicillata* existed in this country and with it, a *Gymnosporangium* identical with the form culturally connected with it in Europe, it becomes a point of interest to inquire the name of the *Gymnosporangium*. European writers usually refer to it as *Gymnosporangium tremelloides* of R. Hartig. Hartig established his name in 1882 after he had made cultures. *Rœstelia penicillata* has been known since 1791 and many authors have referred to it, therefore it did not seem probable that its telial phase, conspicuous as it is, should have remained uncollected until 1882. A study was then begun which ended in the decision that the original *Tremella juniperina* of Linnæus's "Species Plantarum" was none other than the telial phase of *Rœstelia penicillata*. The specific name *juniperina* becomes, therefore, the name of the species, and if we refer it to *Gymnosporangium* the combination is *Gymnosporangium juniperinum* (L.) Mart., Fl. Crypt. Erlang. 333. 1817.

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[3] Arthur, "New Species of Uredineæ," I., *Bull. Torrey Bot. Club*, **28**: 666. 1901.

[4] Farl. Bibl. Index, **1**: 77. 1905. "Under *Æcidium piratum* are given the references to the *Æcidium* of *Gymnosporangium macropus*, but, as the names *Æcidium piratum* and *Æcidium penicillatum*, the latter being in fact the name of a European species not found in North America, have been confused by some American writers, some of the following references may belong to other species."

[5] R. Hartig, *Lehr. Baumkr.*, **1**: 133. 1882; Ed. Fischer, *Hedw.*, **34**: 1–6. 1895; Tubeuf & Smith, "Diseases of Plants," 389. 1897.

[6] The Colorado specimen was collected at Laveta, June 20, 1907, by Miss Allen, of Professor F. E. Clement's party of summer students, and communicated by Professor E. Bethel, of the East Side High School, Denver, Colo. The Alberta collection was made at Laggan, July 20, 1907, by Professor E. W. D. Holway.

RESEARCH DEFENSE SOCIETY[1]

A SOCIETY has been formed, with the name of the Research Defense Society, to make

[1] Lord Cromer has accepted the presidency of the Research Defense Society, to the organization of which we recently called attention, and has addressed this letter to the editor of the London *Times*.