Bemerkungen. Dec. 22 Comet in klaren Momenten hell, rund, 4' Dm, nach der Mitte erst sehr allmählich, dann ziemlich schnell stark verdichtet, fast bis zu einem Kern = 10^m. Beob. unter Wolken und meist bei starkem Dunst, Antritte vielfach kaum aufzufassen. — Dec. 29 und 30 gleichfalls unter Wolken, Völlendung verhindert. — Jan. 2—9 Comet theils bei nebliger Luft, theils bei Mondschein oder Dämmerung schwach und ziemlich schwierig, nur Jan. 8 trotz Mondschein bei klarer Luft gut zu beobachten, Kern an diesem Tage sternartiger. Jan. 9 (und auch sonst wiederholt) mehrfache Kerne vermuthet. — Jan. 14 und 15 Comet bei ganz hellem Mondschein kaum sichtbar, und nur beobachtet, um zu ermitteln, ob die Beobachtungen ähnlicher Objecte an der Grenze der Sichtbarkeit constanten Fehlern unterworfen sein möchten. — Jan. 23—26 Comet hell; Durchmesser-Schätzungen schwanken zwischen 2'0 und 2'5 bis 3'. — Im Febr. theils neblige Luft, theils heller Himmelsgrund, Comet deshalb sehr schwach und schwer zu beobachten; nur Febr. 24 etwas besser. Dm Febr. 23 1'5, Febr. 24 1' geschätzt.

Fortsetzung der Beobachtungen würde bis zum März-Mondschein möglich gewesen sein, wurde aber durch beständig trübes Wetter verhindert.

Bezüglich der Vergleichsterne ist zu bemerken, dass die vorstehenden Ortsangaben für dieselben der ganzen heutigen Sachlage nach nur als provisorische gelten können und später nach den Daten des Cataloges der Astronomischen Gesellschaft zu verbessern oder direct durch neue Meridian-Beobachtungen der Sterne zu ersetzen sind, für welche mir keine Mittel zur Verfügung stehen. Die Anschlüsse der nicht in den Catalogen (bes. nur in der Bonner Durchmusterung) vorkommenden Sterne sind sämmtlich am Ringmikrometer gemacht.

Berlin 1881, Mai 10.

A. Auwers.

Schreiben des Herrn Dr. B. A. Gould, Director der Sternwarte in Cordoba, betreffend den Cometen δ 1881.

Soon after dark on the evening of May 25, as I was passing from my dwelling house to the Observatory with the 2nd Assistant, Mr. Walter G. Davis, he called my attention to a bright star of peculiar appearance in the constellation Columba, and on closer inspection he recognized a tail-like appendage. The first glance with an opera glass showed it to be a comet with a large and brilliant head and a tail, which although faint was clearly discernible for a length of several degrees.

The equatorial telescope was not readily available, having recently been equipped for photographic work. The processes of changing the object glass, lengthening the focal adjustment, replacing the micrometer, preparing the illumination, rearranging the counterbalances,

etc. consumed considerably more than half an hour, at the end of which time the comet was so low that no comparisons by the filar micrometer were to be thought of; and there remained no recourse but to depend upon the readings of the instrumental circles, for determining the position. Of such determinations I obtained three by placing the nucleus approximately in the center of the field. The hour-circle reads only to four seconds of time, and the declination circle to minutes of arc, the radius of the former being only about 17, and that of the latter less than 23 centimeters, but with care somewhat smaller quantities can be estimated. The resultant positions are

Cordoba sid. t.	H. C.	Decl. C.	Z. D.	Refraction		Approximate	
				$\Delta\alpha$	$\Delta\delta$	α	δ
11 ^h 49 ^m 45 ^s 6	6 ^h 49 ^m 12 ^s	146° 4'	82° 8' 34"	26 ^s 1	3' 5	5 ^h 0 ^m 7 ^s 5	— 33° 52' 5
11 54 45.1	6 53 40	146 4	82 44 47	27.9	3.8	7.2	52.2
12 2 37.1	7 1 58	146 3	84 10 12	33.4	4.8	5.7	52.2

The motion being evidently very small in each coordinate we shall probably lose nothing by using the values in round numbers, and after applying to the declinations the index-correction 0'6, I adopt

May 25 11^h 56^m Cordoba sid. t. $\alpha = 5^h 0^m 7^s$ $\delta = -33^\circ 52' 9$.

While the changes in the telescope were making, Mr. Davis, with the aid of an opera-glass, sketched the position of the comet upon Map 3 of the Uranom. Argent. According to this absolutely independent determination, the nucleus was precisely on the five hour circle and in the S. declination 33°9; the coordinates deduced in this rougher way according remarkably with those which I obtained with the telescope.

The faint tail, which appeared almost straight, and nowhere exceeded 12' in width, extended through about 14° as far as the star in Pictor, numbered 20 in the Uranometry, passing very close to Nr. 18 of the

same constellation, and covering the stars 1 and 4 of Columba.

Since the 25th the sky has on every night been covered with clouds or thick haze: but I have succeeded in obtaining observations, although under difficulties. The comet has only for a few moments at a time been distinctly visible to the naked eye, and the tail scarcely at all. The nucleus was on the 25th quite as bright as a star of the 4th magnitude, and it has been impossible to decide, from its aspect since that date whether it was increasing or diminishing in brilliancy, although it must in fact have increased, since it is approaching both sun and earth. On the 27th I estimated its transverse diameter as about a minute of arc. On the two subsequent nights it has seemed not more than 40" or 50"; but the thick mists may have tended to diminish its apparent dimensions. The radius of the coma on

the same night was about 7'. The form of the nucleus has always been quite irregular, its diameter being decidedly greater in the direction at right angles to the tail, and its outline ill-marked but with a depression at the point corresponding to the apex, as though partially bifid. — The observations give the following apparent places, which are probably as good as the adverse circumstances would permit:

1881	Cordoba s. t.	α	δ
May 26	11 ^h 5 ^m 4 ^s 6	5 ^h 0 ^m 35 ^s 3	—33° 19' 15'' 2
27	10 52 21.3	5 1 6.4	32 41 27.1
28	11 13 40.0	5 1 35.8	31 59 12.3
29	11 10 41.3	5 2 8.8	—31 13 38.1

From the positions obtained on May 25, 27, 29, I have deduced the following parabolic elements:

$$\begin{aligned} T &= \text{June 18. 1605 Wash. M. T.} \\ \pi &= 269^{\circ} 4' 20'' \\ \Omega &= 272 9 38 \quad \text{m. Eq. 1881.0} \\ i &= 64 3 39 \\ \log q &= 9.852974. \end{aligned}$$

Motion direct.

This is essentially the same orbit that Bessel found for the great comet of 1807, for which the most probable elliptic elements indicated a return after 1540 years, allowance being made for the effect of planetary perturbations. We thus have a new case analogous to that of the comet of February, 1880; inasmuch as we are brought to the alternative of supposing on the one hand, that the true length of the major axis is not

more than the sixth or seventh part of that which has been deduced with all possible care from good observations, or on the other hand, that more than one large comet is traversing the same orbit. It is true that the recent discoveries in meteoric astronomy render the latter supposition less improbable than it might have appeared twenty years ago, yet the assumption that the true center of gravity is distant by a comparatively small amount from the observed point of maximum brilliancy would suffice to remove all improbability from the former alternative. Should the supposed identity be confirmed, we have yet another member of that well-marked group to which Halley's and Olbers's comets belong.

This preliminary orbit shows that the comet will rapidly move north-wards, till it reaches a very high declination, traversing the constellations of Orion, Auriga, and Camelopardalis. It will probably exhibit a magnificent spectacle in the northern sky during the latter half of June. And as it will to-day or to-morrow be visible from the Observatories of the U. S. and Europe, I sent you yesterday a telegram to that effect. The very great expense exacts an inconvenient brevity, but I think my dispatch, which ought already to be in your hands, will have been intelligible: »Eighteen hundred seven comet, five hours, south thirty degrees«.

Cordoba 1881 May 31.

B. A. Gould.

Die Astronomen können Herrn Gould nur dankbar sein, dass er die bedeutenden Kosten des Telegrammes nicht gescheut hat; wir sind durch dasselbe in Stand gesetzt worden, zu rechter Zeit und am rechten Orte den Cometen aufzusuchen und vom ersten Tage der Sichtbarkeit zu beobachten. Allerdings ist es nicht gelungen, ihn bei Tage aufzufinden.

Kr.

Elliptische Elemente des Cometen 1874 IV.

Dieser von Coggia in Marseille am 19. Aug. 1874 entdeckte Comet ist nahezu drei Monate beobachtet worden, aber die wenigen Elementensysteme, welche für denselben berechnet sind, erstrecken sich nur über die ersten Wochen seiner Sichtbarkeit. Da ich mit einer definitiven Bahnbestimmung des Cometen beschäftigt bin, theile ich hier vorläufig ein Resultat mit, welches von einigem Interesse sein dürfte. Ich suchte nämlich Elemente abzuleiten, welche den ganzen Zeitraum der Beobachtungen umfassen, und bildete zu diesem Zwecke folgende vier Positionen, die sich auf 1874.0 beziehen:

mittl. Zt. Berl.	AR.	Decl.	Beob.
Aug. 21. 58333	60° 32' 47'' 1	+26° 35' 28'' 9	7
Sept. 18. 53459	71 59 40.2	+17 25 58.1	2
Oct. 10. 53367	75 39 30.4	+ 8 3 55.1	4
Nov. 9. 55429	73 24 30.7	— 4 29 22.3	2

Da zeigte sich nun, dass der Lauf des Cometen durch eine parabolische Bahn nicht darzustellen ist. Legt man nämlich durch die beiden äusseren Orte eine Parabel, so lässt sich der in den zwei mittleren Orten

übrig bleibende Fehler nicht weiter, als bis auf 4 Bogenminuten (im grössten Kreise) herunterbringen. Zur Ellipse übergehend, wurde ich auf folgende Elemente geführt:

$$\begin{aligned} T &= 1874, \text{ Juli } 17.72184 \text{ mittl. Zt. Berlin.} \\ \pi &= 5^{\circ} 26' 13'' 0 \\ \Omega &= 215 50 46.9 \\ i &= 34 7 53.7 \end{aligned} \left. \vphantom{\begin{aligned} T \\ \pi \\ \Omega \\ i \end{aligned}} \right\} \text{mittl. Aeq. 1874.0}$$

$$\begin{aligned} \log q &= 0.227275 \\ \log e &= 9.983277 \\ a &= 44.671 \\ U &= 298.6 \text{ Jahre.} \end{aligned}$$

Darstellung der zwei mittleren Orte (B—R):

$$\begin{array}{rcl} da \cos \delta & & d\delta \\ - 3'' 6 & + & 1'' 5 \\ + 3.3 & - & 2.0 \end{array}$$

Es sei noch bemerkt, dass der Comet sowohl während seiner Sichtbarkeit, als auch vor seiner Entdeckung keinem einzigen Planeten nahe gekommen ist.