The similarity in length of the Ru—C(17) and Ru—C(26) bonds is reflected in the bonding to the carbonyl ligands [Ru—C(29), 1·918 (5); Ru—C(30), 1·914 (5) Å]. These bond lengths are very close to that [1·91 (2) Å] to the carbonyl ligand *trans* to the alkenyl ligand in $[Ru(CO)_2\{C(CO_2Me){=}C(CO_2Me)Cl\}Cl(PMe_2Ph)_2]$ (Holland *et al.*, 1983).

The Ru—P bond lengths [Ru—P(1), 2·362 (1); Ru—P(2), 2·364 (1) Å] are in good agreement with the values observed for other ruthenium(II) complexes containing a pair of mutally *trans* PMe_2Ph ligands (Ashworth, Nolte, Singleton & Laing, 1977; Dauter, Mawby, Reynolds & Saunders, 1983).

The packing within the unit cell is shown in Fig. 2. The crystal packing is stabilized largely by van der Waals forces; the closest intermolecular contact involving the non-H atoms is 3·362 (8) Å [O(3)···C(5), $-x$, $-1-y$, $-z$] and between H atoms is 2·21 (4) Å [H(C2*B*)···H(C2*B*), $-x$, $-1-y$, $-1-z$].

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Structure of Bis(glycinato)zinc(II) Monohydrate, a Five-Coordinate Zinc(II) Complex

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Abstract. $[Zn(C_2H_4NO_2)_2].H_2O$, $M_r = 231{\cdot}5$, triclinic, $P\bar{1}$, $a = 9{\cdot}165\ (7)$, $b = 9{\cdot}571\ (7)$, $c = 10{\cdot}438\ (9)$ Å, $\alpha = 105{\cdot}97\ (4)$, $\beta = 106{\cdot}19\ (4)$, $\gamma = 107{\cdot}12\ (4)°$, $V = 774\ (2)$ Å^3, $Z = 4$, $D_m = 1{\cdot}97\ (2)$, $D_x = 1{\cdot}99$ g cm^{-3}, Mo $K\alpha$, $\lambda = 0{\cdot}71069$ Å, $\mu = 32{\cdot}01$ cm^{-1}, $F(000) = 472$, $T = 294$ K. Final $R = 0{\cdot}028$ for 2056 observed reflections. There are two formula units in the asymmetric unit. Each of the two crystallographically independent Zn atoms is five-coordinate, is chelated by two glycinate molecules, and forms a fifth bond to a carboxyl O atom in a neighbouring bis(glycinato)zinc complex. The coordination is approximately square-pyramidal with a significant distortion towards trigonal-bipyramidal geometry. About 10% of the Zn atoms of each type occupy alternative sites in which the chelating ligands and the coordination geometry are retained, but in which the fifth donor atom belongs to a different neighbouring complex. If all the Zn atoms occupied positions half-way between their major and minor sites, the coordination would be octahedral, as originally proposed by Low, Hirshfeld & Richards [*J. Am. Chem. Soc.* (1959), **81**, 4412–4416]. The complexes are linked into polymeric sheets. The water molecules occupy interstitial positions.

Introduction. The structure of the glycinate complex of zinc was originally reported by Low, Hirshfeld & Richards (1959) as part of a study of the coordination of zinc by amino acids. The complex was described as a 'most unpromising' candidate for a complete structure analysis under the conditions at that time. Not only were there eight bis(glycinato)zinc(II) monohydrate formula units in the triclinic unit cell, but all reflections described as having odd values of $[h + \frac{1}{2}(k - l)]$ were extremely weak. The corresponding cadmium complex, bis(glycinato)cadmium(II) monohydrate, crystallized in a space group of higher symmetry and was amenable to crystallographic analysis by two-dimensional

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methods. The cadmium and zinc complexes were described as 'approximately isomorphous' if a non-primitive space group ($A\bar{1}$) was chosen for the latter. A structure could then be inferred for the zinc complex from an analysis of the *a*- and *b*-axis Patterson projections together with some apparent points of analogy with the structure of the cadmium complex. In the Low, Hirshfeld & Richards structure, the Zn atom is octahedrally coordinated. Two glycinate ligands chelate the metal atom in a planar *trans* arrangement, the remaining two coordination positions being occupied by carboxyl O atoms of glycinate ligands in neighbouring complexes. This description has been accepted for almost 30 years (see, *e.g.*, Krishnan & Plane, 1967; Miceli & Stuehr, 1972; Ozutsumi & Ohtaki, 1985; Cotton & Wilkinson, 1988).

Experimental. Crystals of bis(glycinato)zinc(II) monohydrate, $[Zn(NH_2CH_2COO)_2].H_2O$, formed as thin plates, often with striations on the large faces. Photographic analysis of the first crystal chosen revealed a triclinic unit cell with dimensions $a = 10{\cdot}44$, $b = 12{\cdot}13$, $c = 15{\cdot}04$ Å, $\alpha = 87{\cdot}3$, $\beta = 89{\cdot}6$, $\gamma = 62{\cdot}2°$, a reoriented version of the cell reported by Low *et al.* (1959). The rows of weak spots reported previously were also observed. A unit cell was determined using diffractometer methods, but it was found that this cell resulted in systematically poor predictions of reflections with *h* and *k* odd. Reflections in this category deviated by up to 0·5° from calculated angles. The crystal was abandoned on the assumption that it was twinned. Photographic analysis of a second specimen indicated a different triclinic unit cell with a volume only half as large as that of the previous cell. Dimensions of the unit cell determined by diffractometry are given in the *Abstract*. The positions of all classes of reflection were predicted equally well by the new unit cell. Reflections with $h + k$ odd were found to be weaker than the average.

Well formed crystals of the complex were difficult to obtain, and specimens for diffractometry had to be cleaved from larger crystals. A suitable but irregular crystal having a re-entrant angle was eventually mounted on a glass fibre with epoxy resin. Density measured by flotation. Data were collected using an Enraf–Nonius CAD-4 automatic diffractometer, graphite-monochromated Mo $K\alpha$ radiation. 25 independent reflections with $19 \leq 2\theta \leq 25°$ were used for least-squares determination of cell constants. Intensities of three reflections were monitored, and indicated less than 3% decomposition. The irregular shape of the crystal led to difficulties in the computation of absorption corrections. The structure was solved by Patterson methods. Refinement progressed normally to a residual of 0·10. At this stage two peaks, each about 1·0 Å from a Zn atom and about 8 e Å^{-3} in height, remained in an electron-density difference map.

Since there was a risk that the refinement had been affected by systematic errors in the data (see above), the data collection was repeated using a more regularly shaped crystal. Refinement of the structure using the second data set yielded a lower residual but provided no evidence of systematic errors in the first refinement. An electron-density difference map again had significant peaks at about 1·0 Å from each of the two independent Zn atoms, Zn(1) and Zn(2). The presence of these peaks after refinements based on two data sets led to the conclusion that Zn(1) and Zn(2) were disordered. Refinement of complementary occupancy factors for each of the two sites gave ratios 90 (1):10 (1) for Zn(1):Zn(1*A*) and 84 (1):16 (1) for Zn(2):Zn(2*A*), respectively. The same occupancy factors were obtained from both data sets.* All non-H atoms were refined with anisotropic thermal parameters. H atoms were located and refined with individual isotropic thermal parameters. Full-matrix least-squares refinement converged with all shifts less than 0·05σ. Maximum excursions in a final difference map were 0·4 and $-0{\cdot}3$ e Å^{-3}.

All calculations were performed using the *SHELX76* system of programs (Sheldrick, 1976). Drawings were produced using program *ORTEP* (Johnson, 1965). Scattering factors (neutral Zn for Zn$^{\rm II}$) and anomalous-dispersion terms were taken from *International Tables for X-ray Crystallography* (1974). Data-collection and refinement parameters are collected in Table 1. Final positional parameters are listed in Tables 2 and 3.†

Discussion. The smaller unit cell ultimately obtained in the present study is related to the original larger cell by the transformation matrix (001, $\bar{1}\bar{1}0$, $1\bar{1}0$). The larger cell is a reoriented version of the primitive cell previously reported by Low *et al.* (1959). It appears that the larger cell is the result of twinning. The best developed faces of the crystals are {110} forms of the smaller cell, and the components of the

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* Alternative descriptions of the crystal as being either (i) noncentrosymmetric (*P*1) and *ordered*, or (ii) formed by the intergrowth of two phases, were rejected: (i) is inconsistent with the large differences between the occupancies of the major and minor sites, and (ii) is inconsistent with the significantly different occupancies at Zn(1) and Zn(2), and with the fact that the same occupancies were observed in two crystal specimens.

† Lists of structure amplitudes, anisotropic thermal parameters of non-H atoms, positional and isotropic thermal parameters of H atoms, bond lengths and angles in the ligand molecules, close contacts and details of least-squares-planes calculations have been deposited with the British Library Document Supply Centre as Supplementary Publication No. SUP 52203 (19 pp.). Copies may be obtained through The Executive Secretary, International Union of Crystallography, 5 Abbey Square, Chester CH1 2HU, England.

Table 1. *Summary of data-collection and -processing parameters*

Crystal dimensions (mm)	0·30 × 0·04 × 0·10
Crystal forms*	{$\bar{1}$10}, {110}
Data-collection range (°)	$2 \le 2\theta \le 50$
Scan width (°)	$1·20 + 0·35\tan\theta$
Horizontal counter aperture (mm)	$2·40 + 0·50\tan\theta$
Scan type	ω–0·66θ
Absorption correction:†	
No. of sampling points	8 × 8 × 8
maximum correction	1·348
minimum correction	1·083
Range of *hkl*	*h* −10→10, *k* −11→11, *l* 0→12
$R_{\rm int}$	0·021
Total data collected	2891
Data with $I \ge 2·5\sigma(I)$	2056
Total variables	261
Function minimized	$\sum w(\lvert F_o\rvert - \lvert F_c\rvert)^2$
Weights *w*	$1/[\sigma^2(F_o) + kF_o^2]$
Weighting constant *k*	0·00049
GOF	1·10
R	0·028
wR	0·038

* Irregular crystal fragment. Other faces (111) and approximately (138).

† Coppens, Leiserowitz & Rabinovich (1965).

Table 2. *Atomic coordinates with e.s.d's in parentheses and equivalent isotropic thermal parameters B_{eq} (Å^2)*

$$B_{\rm eq} = (8\pi^2/3)\textstyle\sum_i\sum_j U_{ij}a_i^*a_j^*\mathbf{a}_i.\mathbf{a}_j.$$

	x	*y*	*z*	$B_{\rm eq}$
Zn(1)	0·9959 (1)	0·9362 (1)	0·7527 (1)	2·00
Zn(1*A*)	1·0059 (5)	1·0491 (6)	0·7505 (4)	2·61
Zn(2)	0·5098 (1)	0·5571 (1)	0·2792 (1)	1·99
Zn(2*A*)	0·4980 (3)	0·4442 (4)	0·2164 (3)	2·61
O(1)	1·1881 (3)	1·0882 (3)	0·9591 (2)	3·26
O(2)	1·4623 (3)	1·2003 (4)	1·0689 (3)	4·34
O(3)	0·8077 (3)	0·8437 (3)	0·5377 (2)	2·62
O(4)	0·5342 (3)	0·7583 (3)	0·4331 (2)	3·05
O(5)	0·6943 (3)	0·6333 (3)	0·2023 (2)	2·90
O(6)	0·9627 (3)	0·6925 (4)	0·2570 (3)	4·14
O(7)	0·3092 (3)	0·3891 (3)	0·3069 (2)	3·06
O(8)	0·0340 (3)	0·2660 (3)	0·2131 (3)	2·92
O(9)	1·7539 (4)	1·2439 (4)	1·5198 (3)	3·98
O(10)	0·7436 (4)	0·2522 (4)	0·0117 (3)	3·50
N(1)	1·1883 (3)	0·9940 (3)	0·6916 (3)	2·29
N(2)	0·8308 (4)	1·0256 (4)	0·7947 (3)	2·99
N(3)	0·6687 (4)	0·4668 (4)	0·3691 (4)	3·18
N(4)	0·3151 (3)	0·5080 (3)	0·1017 (3)	2·36
C(1)	1·3455 (4)	1·0522 (4)	0·8156 (3)	2·40
C(2)	1·3304 (4)	1·1199 (4)	0·9587 (4)	2·48
C(3)	0·6661 (4)	0·9419 (4)	0·6764 (4)	2·43
C(4)	0·6721 (4)	0·8418 (4)	0·5394 (3)	2·17
C(5)	0·8316 (4)	0·5354 (4)	0·3644 (4)	2·60
C(6)	0·8300 (4)	0·6278 (4)	0·2677 (3)	2·28
C(7)	0·1558 (4)	0·4365 (4)	0·1118 (4)	2·39
C(8)	0·1698 (4)	0·3580 (4)	0·2191 (3)	1·92

The e.s.d.'s shown in parentheses are calculated from the least-squares refinement. The actual precision is lower as a result of disorder (see text).

Table 3. *Bond lengths* (Å) *and angles* (°) *involving* Zn *atoms*

Complex 1		Complex 2	
Zn(1)—O(1)	2·123 (2)	Zn(2)—O(5)	2·094 (2)
Zn(1)—O(3)	2·155 (2)	Zn(2)—O(7)	2·204 (2)
Zn(1)—O(8$^{\rm i}$)	2·017 (2)	Zn(2)—O(4)	2·046 (3)
Zn(1)—N(1)	2·018 (3)	Zn(2)—N(3)	2·043 (3)
Zn(1)—N(2)	2·035 (3)	Zn(2)—N(4)	2·005 (3)
Zn(1)···O(6$^{\rm ii}$)	3·495 (3)	Zn(2)···O(2$^{\rm iii}$)	3·336 (3)
O(1)—Zn(1)—O(3)	164·1 (1)	O(5)—Zn(2)—O(7)	157·9 (1)
O(1)—Zn(1)—O(8$^{\rm i}$)	95·6 (1)	O(5)—Zn(2)—O(4)	105·1 (1)
O(1)—Zn(1)—N(1)	80·9 (1)	O(5)—Zn(2)—N(3)	80·6 (1)
O(1)—Zn(1)—N(2)	93·5 (1)	O(5)—Zn(2)—N(4)	97·0 (1)
O(3)—Zn(1)—O(8$^{\rm i}$)	100·3 (1)	O(7)—Zn(2)—O(4)	96·8 (1)
O(3)—Zn(1)—N(1)	95·0 (1)	O(7)—Zn(2)—N(3)	89·3 (1)
O(3)—Zn(1)—N(2)	79·4 (1)	O(7)—Zn(2)—N(4)	79·4 (1)
O(8$^{\rm i}$)—Zn(1)—N(1)	109·4 (1)	O(4)—Zn(2)—N(3)	110·0 (1)
O(8$^{\rm i}$)—Zn(1)—N(2)	112·1 (1)	O(4)—Zn(2)—N(4)	106·0 (1)
N(1)—Zn(1)—N(2)	138·5 (1)	N(3)—Zn(2)—N(4)	143·3 (1)
Zn(1)—O(1)—C(2)	113·4 (2)	Zn(2)—O(5)—C(6)	114·2 (2)
Zn(1)—O(3)—C(4)	112·2 (2)	Zn(2)—O(7)—C(8)	112·6 (2)
Zn(1)—O(8$^{\rm i}$)—C(8$^{\rm i}$)	123·6 (2)	Zn(2)—O(4)—C(4)	119·0 (2)
Zn(1)—N(1)—C(1)	110·3 (2)	Zn(2)—N(3)—C(5)	111·7 (2)
Zn(1)—N(2)—C(3)	112·3 (2)	Zn(2)—N(4)—C(7)	112·6 (2)

See note to Table 2 concerning precision. Symmetry operations: (i) $1-x$, $1-y$, $1-z$; (ii) $2-x$, $2-y$, $1-z$; (iii) $-1+x$, $-1+y$, $-1+z$.

twinned crystals are probably related by a rotation of 180° about the normal to this plane.

Each of the crystallographically independent Zn atoms Zn(1) and Zn(2) is chelated by two glycinate ligands (Fig. 1). The coordination geometry is approximately square-pyramidal, the N(amino) and O(carboxyl) atoms of the glycinate ligands lying at the corners of the base of the pyramid in a *trans* configuration. The apex of the pyramid is occupied by an O(carboxyl) atom from a neighbouring Zn(Gly)$_2$ complex. A slight complication is created by the disorder of the Zn atoms (see *Experimental*). The ligands of the Zn atoms in the minor sites Zn(1*A*) and Zn(2*A*) are the same as those of the Zn atoms in the major sites, and their coordination geometries are similar, with the exception that the fifth coordination position is occupied by an O(carboxyl) atom from a different neighbouring complex (Fig. 2). The major and minor sites of Zn(1) and Zn(2) are separated by 1·065 (3) and 1·054 (3) Å, respectively. If Zn atoms occupied the centroids of the major and minor sites, the Zn···O(carboxyl) distances would be 2·53 and 2·97 Å at Zn(1), and 2·58 and 2·81 Å at Zn(2), respectively. The structure would then be a mildly distorted version of that found for bis(glycinato)cadmium(II) monohydrate (Low *et al.*, 1959).

The linking of adjacent Zn(Gly)$_2$ complexes gives rise to polymeric sheets lying in the (110) plane (Fig. 2), consistent with the facile cleavage observed along the 110 faces. The water molecules lie between the sheets and link them by hydrogen bonds. The layering is very similar to that observed in the structure of the analogous cadmium complex (Low *et al.*, 1959). All H(amine) atoms participate in hydrogen bonds to either O(carboxyl) or O(water) atoms, and all H(water) atoms are involved in hydrogen bonds to O(carboxyl) atoms.

The disorder of the Zn atoms imparts some disorder to the atoms bonded to them. The effect of this disorder is evident in the thermal ellipsoids, which have a long axis oriented parallel to the vector between the major and minor Zn sites. Attempts to resolve the donor atoms at the minor sites from those at the major sites during the refinement were unsuccessful, suggesting that the differences between the atomic positions are smaller than 0·4 Å (half the nominal resolution of the data). The accuracy of the Zn—ligand distances at the major Zn sites is reduced by the disorder, and the Zn—ligand distances derived from the minor sites have no physical significance.

There are significant differences between the geometries of the two major Zn sites. Corresponding bond lengths at Zn(1) and Zn(2) differ by as much as 0·05 Å, and corresponding angles by up to 14° (Table 3). The Zn—O(carboxyl) distances vary over a particularly wide range, 2·017 (3) to 2·204 (3) Å. The variability of Zn—ligand distances is well known. For example, the Zn—OH_2 distances in the pentaaquazinc(II) cation range from 1·93 (1) to 2·18 (1) Å (Podlahová, Kratochvíl, Podlaha & Hašek, 1985). Nevertheless, there is no doubt that both Zn(1) and Zn(2) are truly five-coordinate. In both cases the next-nearest neighbour is the O(carboxyl) atom which is bonded to the Zn atom in the corresponding minor site. The Zn···O distances to these O(carboxyl) atoms are too long [3·495 (3), 3·336 (3) Å] to be described as bonds. A similar but less clear-cut coordination geometry occurs in bis(L-serinato)zinc(II) where the Zn is five-coordinate but interacts with an additional O atom at 2·996 (2) Å (van der Helm, Nicholas & Fisher, 1970). The sixth Zn···O interaction in the L-serinato complex is short enough to be described as a weak bond, but is clearly much shorter than the two Zn···O distances in the present structure.

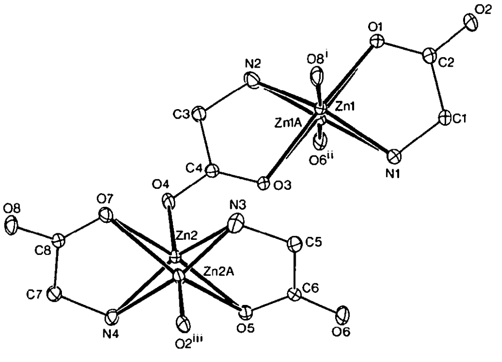

Fig. 1. Coordination of Zn(1) and Zn(2) in $Zn(Gly)_2.H_2O$, showing atomic labels. Superscripts denote symmetry operations as defined in Table 3.

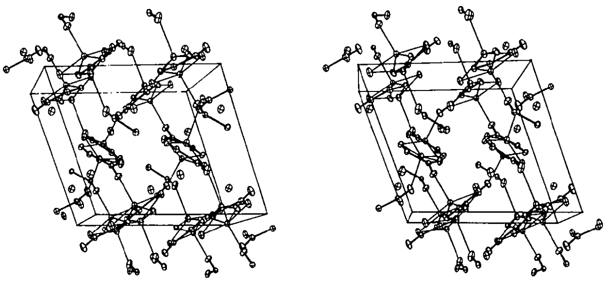

Fig. 2. Unit cell of $Zn(Gly)_2.H_2O$, showing disordered Zn atoms. Origin at bottom left, $0 \le x \le a$ away from reader, $0 \le y \le b$ up, $0 \le z \le c$ horizontal.

Further results consistent with five-coordination are obtained if the five Zn—ligand bond lengths at Zn(1) and Zn(2) in $Zn(Gly)_2.H_2O$ are averaged, giving values 2·070 and 2·078 Å, respectively. In the structures of other Zn–amino acidato complexes containing only N(amino), O(carboxyl) and O(water) donor atoms, the average of the Zn—ligand bond lengths is 2·06–2·08 Å when the coordination number is five (Gramaccioli, 1966; van der Helm *et al.*, 1970; Grewe, Udupa & Krebs, 1982; Castellano, Oliva, Zukerman-Schpector & Calvo, 1986), whereas it is 2·13–2·14 Å when the coordination number is six (Kryger & Rasmussen, 1973; Hämäläinen, 1977; Castellano *et al.*, 1986). The increase is consistent with previous observations that Zn—N(amino) and Zn—N(imidazole) bonds are systematically longer in octahedral complexes than in tetrahedral complexes (Freeman, 1967; Bear, Duggan & Freeman, 1975).

At first sight, the positions of the major and minor Zn sites in $Zn(Gly)_2.H_2O$ in relation to the ligand molecules are similar to those which might be occupied by a five-coordinate Zn atom before and after an associative ligand interchange reaction such as

$$A + ZnL_4—B \rightarrow A—ZnL_4 + B$$

(where L represents any monodentate ligand group). We are not aware of any examples of such a reaction involving Zn. On the other hand, complexes in which Zn is five-coordinate are of interest as potential models for the transition states of some Zn enzymes with four-coordinate Zn atoms. Relevant literature has been cited by Auf der Heyde & Nassimbeni (1984), who have shown that the geometries of 33 five-coordinate Zn complexes can be arranged in an order which maps a mechanism for bimolecular substitution reactions at tetrahedral Zn centres. In this mechanism the attack of a nucleophile converts a tetrahedral Zn centre into a trigonal-bipyramidal intermediate which may undergo either axial dissociation or conversion to a different trigonal-bipyramidal configuration. The 'Berry mechanism' for the latter conversion involves pseudo-rotation *via* a square-pyramidal transition state.

The present work fits nicely into the structural correlation established by Auf der Heyde & Nassimbeni (1984). It turns out that the description of the two Zn atoms in $Zn(Gly)_2.H_2O$ as having an 'approximately square-pyramidal' coordination geometry (see above) is an over-simplification. In terms of the criteria proposed by Auf der Heyde & Nassimbeni for five-coordinate Zn complexes, the angles at both Zn(1) and Zn(2) lie between the values for trigonal-bipyramidal (tbp) and square-pyramidal (sp) geometries.* Appropriate calculations show that both Zn atoms lie on the Berry coordinate of Fig. 5 in the cited reference, the tbp:sp ratios being 47:53 for Zn(1) and 33:67 for Zn(2), respectively.† The shallowness of the free-energy minimum for five-coordinate Zn is illustrated by the fact that two Zn sites with significantly different geometries lying on the Berry coordinate occur in the same unit cell.

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* The ligand atoms corresponding to positions 1–5 in the scheme of Auf der Heyde & Nassimbeni (1984) are: Zn(1) - O(1), N(1), O(8), N(2), O(3); Zn(2) - O(5), N(3), O(4), N(4), O(7). In the description of a tbp complex, positions 1 and 5 are axial, and positions 2, 3 and 4 are equatorial. In the description of an sp complex, position 3 is the apex of the pyramid and positions 1, 2, 4 and 5 are adjacent corners of the base.

† While our description of the glycinate ligand configurations as '*trans*-N(amino)-*trans*-O(carboxyl)' would be inappropriate in a tbp complex, it remains intact since the coordination geometries of Zn(1) and Zn(2) are more sp than tbp.

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trans-Chlorohydridobis[tris(*p*-tolyl)phosphine]platinum(II)

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Abstract. $[Pt(Cl)(H)(C_{21}H_{21}P)_2]$, $M_r = 840{\cdot}30$, triclinic, $P\bar{1}$, $a = 11{\cdot}336\ (4)$, $b = 16{\cdot}682\ (3)$, $c = 11{\cdot}049\ (2)$ Å, $\alpha = 103{\cdot}03\ (2)$, $\beta = 113{\cdot}32\ (2)$, $\gamma = 85{\cdot}87\ (2)^\circ$, $V = 1868{\cdot}9\ (1{\cdot}8)$ Å^3, $Z = 2$, $D_x = 1{\cdot}49$ g cm^{-3}, $\lambda(\text{Mo } K\alpha) = 0{\cdot}71073$ Å, $\mu = 39{\cdot}8$ cm^{-1}, $F(000) = 840$, $T = 294\ (1)$ K, $R = 0{\cdot}041$ for 5149 unique reflections with $F^2 > 3\sigma(F^2)$ of 7313 total unique data. Principal bond lengths (Å) and angles (°) are: Pt—P 2·278 (2), 2·282 (2); Pt—Cl 2·384 (3); P—Pt—P 167·18 (9); Cl—Pt—P 94·52 (8), 97·98 (8).

Introduction. Hydride complexes of platinum(II) exhibit a rich and varied chemistry, including applications in homogeneous catalysis (Hartley, 1973, and references therein). Among the well-known series of *trans*-$[PtH(X)(PR_3)_2]$ complexes, the complex *trans*-$[PtH(Cl)(PPh_3)_2]$ (1), containing stabilizing triarylphosphine ligands, has perhaps been the most studied example in synthetic and catalytic work. Attempts to completely characterize this complex by X-ray crystallography have been largely unsuccessful, although a preliminary report (Bender, Braunstein, Jud & Dusausory, 1984) of a determination using a poor-quality crystal was made in 1984. Here we describe the structure of a close relative, *trans*-$[PtH(Cl)\{P(p\text{-tolyl})_3\}_2]$ (2), where the presence of the

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